FORM PTO-1390 (REV 12-29-99) U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

ATTORNEY'S DOCKET NUMBER: VWF-513-A

U.S. APPLICATION NO. (If known, see 37 CFR 1.5): 09/787992

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/FR99/02280	24 September 1999	24 September 1998

TITLE OF INVENTION: TRANSMISSION PART IN PLASTIC MATERIAL WITH DIFFERENTIATED FILLERS

APPLICANT(S) FOR DO/EO/US: Bruno Lisiecki

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. [X] This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. [ ] This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. [X] This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. [ ] A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. [X] A copy of the International Application as filed (35 U.S.C. 371(c)(2))
   a. [X] is transmitted herewith (required only if not transmitted by the International Bureau).
   b. [ ] has been transmitted by the International Bureau.
   c. [ ] is not required, as the application was filed in the United States Receiving Office (RO/US).
6. [X] A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. [ ] Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
   a. [ ] are transmitted herewith (required only if not transmitted by the International Bureau).
   b. [ ] have been transmitted by the International Bureau.
   c. [ ] have not been made; however, the time limit for making such amendments has NOT expired.
   d. [ ] have not been made and will not be made.
8. [ ] A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. [X] An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)). Unsigned Copy
10. [ ] A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern document(s) or information included:

11. [ ] An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. [ ] An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. [X] A FIRST preliminary amendment.
    [ ] A SECOND or SUBSEQUENT preliminary amendment.
14. [X] A substitute specification.
15. [ ] A change of power of attorney and/or address letter.
16. [X] Other items or information: Red-Line Specification

U.S. APPLICATION NO (if known, see 37 CFR 1.5) 09/787992	INTERNATIONAL APPLICATION NO PCT/FR99/02280	ATTORNEY'S DOCKET NUMBER VWF-513-A

17. XX The following fees are submitted:	CALCULATIONS PTO USE ONLY	
BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)) :		
Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO $970.00		
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO $840.00		
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO $690.00		
International preliminary examination fee paid to USPTO (37 CFR 1.482) but all claims did not satisfy provisions of PCT Article 33(1)-(4) $670.00		
International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(1)-(4) $96.00		
ENTER APPROPRIATE BASIC FEE AMOUNT =	$ 840	
Surcharge of $130.00 for furnishing the oath or declaration later than ☒ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(e)).	$ 130	

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total claims	11 - 20 =		X $18.00	$ 0	
Independent claims	1 - 3 =		X $78.00	$ 0	
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ $260.00	$ 0	
TOTAL OF ABOVE CALCULATIONS =				$	
Reduction of 1/2 for filing by small entity, if applicable. A Small Entity Statement must also by filed (Note 37 CFR 1.9, 1.27, 1.28).				$ 0	
SUBTOTAL =				$ 970	
Processing fee of $130.00 for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(f)). +				$ 0	
TOTAL NATIONAL FEE =				$ 970	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). $40.00 per property +				$ 0	
TOTAL FEES ENCLOSED =				$ 970	
				Amount to be: refunded	$
				charged	$

a. XX A check in the amount of $ 970.00 to cover the above fees is enclosed.

b. ☐ Please charge my Deposit Account No. _____ in the amount of $_____ to cover the above fees. A duplicate copy of this sheet is enclosed.

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 25-0115. A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

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SIGNATURE

William M. Hanlon, Jr.
NAME

28422
REGISTRATION NUMBER

09/787992

JC08 Rec'd PCT/PTO 23 MAR 2001

CERTIFICATION

To whom it may concern:

This is to certify that the attached translation from French into English is an accurate representation of the document translated by the undersigned. This document is designated as:

Patent for: TRANSMISSION PART, IN PARTICULAR WIPER ARM, IN PLASTIC MATERIAL WITH DIFFERENTIATED FILLERS

The undersigned declares that she is fluent in French and standard North American English and qualified to translate. She attests to the following:

"To the best of my knowledge, the accompanying text is a true, full and accurate translation of the specified document."

Jennifer L. Zichterman

STATE OF COLORADO)
COUNTY OF Denver **) SS**
UNITED STATES OF AMERICA)

Subscribed and Sworn to before me this 12 day of March, 2001.

[seal]

NOTARY PUBLIC:
Denver County, Colorado

My Commission Expires: **My Commission Expires 02/08/2005**

09787992 . 032301

Our Reference: VWF-513-A (WF 0416) PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	VALEO ELECTRICAL SYSTEMS, INC.
Serial Number:	Unknown
Filing Date:	Concurrent
Examiner/Art Group Unit:	Unknown/Unknown
Title:	TRANSMISSION PART IN PLASTIC MATERIAL WITH DIFFERENTIATED FILLERS

PRELIMINARY AMENDMENT

Assistant Commissioner of Patents
Washington, D.C. 20231

Sir:

Prior to initial examination, please amend the above-identified patent application as indicated below.

In the specification:

After the claims, start a new page and insert the following:

--ABSTRACT

Transmission parts produced in a plastic material with differentiated fillers dedicated to more specific functions so as to enhance the mechanical and physico-chemical performance of transmission parts which are at least partially exposed to the open air. More particularly, the invention is a wiper arm made in plastic and including driving means consisting of a shell part forming a shroud and made in a thermoplastic material substantially filled with more than 30% of fibers, and a baseplate part not directly exposed to air, the baseplate part being made in a thermoplastic material substantially filled with at least 40% of fibers. --.

In the claims:

Cancel claims 1 - 11 and substitute therefor new claims 12 - 22.

12. (New) A mechanical transmission part exposed at least partially to the open air, made of a plastic material and containing connection

means arranged on the end portions of the part, characterized by being formed, outside of end portions, by a body part forming streamlining and made of a thermoplastic material filled with no more than 30% fibers, and a flange part not directly exposed to the open air, made of a thermoplastic material filled with less than 40% fibers.

13. (New) The transmission part according to claim 12, characterized by the thermoplastic material of the body part being filled with between 20% and 30% fibers, and the thermoplastic material of the flange part is filled with between 40% and 50% fibers.

14. (New) The transmission part according to claim 12 characterized by the fibers being glass or textile fibers, and by a system of ribs placed on the interior of the body part and the flange part.

15. (New) The transmission part according to claim 12, characterized by the body part and the flange part forming two solid parts and by the body presenting two lateral side walls linked by a back part and having ends, the ribs belonging at least partially to the body part and the flange part.

16. (New) The transmission part according to claim 15, characterized by the body part and the flange part being assembled by one of gluing, soldering, screwing, riveting, and clipping.

17. (New) The transmission part according to claim 16 characterized by the body part resting on the flange part, the body part and the flange part being created on the ends of the lateral side walls of the body.

18. (New) The transmission part according to claim 15, characterized by, where the transmission part is a wiper arm, a washer canal and sprayers are directly integrated into the flange.

19. (New) The transmission part according to claim 12, characterized by being constructed from casting, the body part and the flange part being one of pre-filled with fibers and selectively filled outside of casting.

20. (New) The transmission part according to claim 12, characterized by the flange part being inclined in relation to a longitudinal axis of the body to improve the aerodynamic performance of the arm.

21. (New) The transmission piece according to claim 14, characterized by the flange part being created with one of a variable thickness and a convex curve at one of the ends, the geometry of the ribs being adapted to the geometry of the flange part.

22. (New) The transmission part according to claim 12, characterized by the body having a transverse polygon shape with rounded tops.

REMARKS

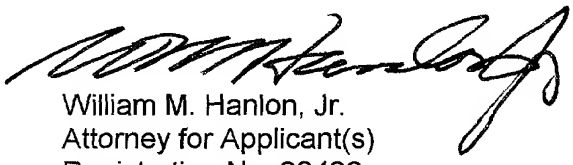
After entry of this amendment, claims 1 -11 are canceled and substituting therefore new claims 12 - 22 .

A handwritten, corrected copy of the specification is enclosed showing the changes which have been made to the specification as required by Section 608.01(Q) and 714.20(1) of the Manual of Patent Examining Procedure. The Substitute Specification filed herewith has been amended to utilize idiomatic English, correct minor typographical and grammatical errors and to conform the application to current United States patent practice. The Substitute Specification includes no new subject matter; but does include the same changes handwritten in red in the attached, corrected, original specification. Entry of the Substitute Specification is respectfully requested.

It is submitted that this Amendment has antecedent basis in the application as originally filed, including the specification, claims and drawings, and that this Amendment does not add any new subject matter to the application. Consideration of the application as amended is requested.

Respectfully submitted,

YOUNG, BASILE, HANLON, MacFARLANE,
WOOD & HELMHOLDT, P.C.



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Dated: March 23, 2001
WMH/dge/jo

(all caps) Transmission part [in particular a wiper arm,] in plastic material with differentiated fillers.

BACKGROUND

This invention involves the mechanical transmission by elongated parts made of a plastic material and exposed, at least partially, to the open air. Such parts are used, in particular, as wiper arms, but are also used in the form of connecting rods in the mechanisms of mechanical transmissions.

In this type of use, the plastic material is subjected to severe environmental constraints: mechanical efforts at a high level of repetition, temperature variation, exposure to UV rays, etc. This has resulted in an accelerated aging of the level of mechanical performance, by the appearance of defaults in rigidity and deformation via creep, and at the physical-chemical level via the action of UV rays.

In order to improve the mechanical performance of such parts, it has been proposed in [the document] DE 2839587 to create [them] (such parts) in a symmetrical half shell shape in a plastic mold assembled by a molded hinge.

The patent GB 2021939 describes the implementation of a hood of the arm forming a complete streamlining of the arm. The hood is attached by means of regulators and, perhaps, made in plastic.

In patent FR 2557052, it was foreseen to cast the metallic arm in order to create a streamlining in plastic material.

These solutions [didn't] (did not) resolve the problem evoked because they divulged (from) global solutions, unlikely to adapt to the changing conditions of the environment.

SUMMARY

In order to resolve this problem, and in particular, to improve the mechanical and physical-chemical performance of such parts, the present invention proposes to create [them] (such parts) in a plastic material with differentiated fillers, dedicated to more specific functions.

More precisely, the subject of the invention is a mechanical transmission part exposed at least partially to the open air, (and) more specifically, a wiper arm, made of a plastic material and containing means of connection arranged on the end portions of the part; [this] (. This) part is formed, outside of its end portions, of first a body part, forming a streamlining and made of a thermoplastic material filled with at most 30% fibers, and second, a flange not directly exposed, the flange part being made of a thermoplastic material filled with at least

40% fibers.

Thus, the functions of the mechanical parts are spread in the space in order to be optimized; the body part, which is the "visible" part, exposed to the environment, is dedicated to the function of style by masking the eventual ribs and by resisting physical-chemical attacks, while the flange part, turned towards the windshield and, thus, not directly exposed, achieves the base architecture of the part by exerting, via its improved rigidity compared to the exposed part, a function of mechanical resistance for the unit, with a reduced permanent deformation. The presentation of a closed structure multiplies, by a factor of four, the inertia of the arm against external attacks.

On the other hand, the casting can be simplified by suppression or diminution of the number of ribs.

According to the specific methods of production:

- the percentage of fibers is notably between 20 and 30% for the body part and between 40 to 50% for the flange part;
- the body and the flange form two solidified parts;
- the fibers are glass or textile fibers, such as aramid, polyamides, or polyester;
- the body part contains a system of ribs surrounded by the streamlining;
- the two parts are assembled via gluing, soldering, screwing, riveting, or clipping;
- the windshield washing components, canals and sprayers are directly integrated into the flange;
- the flange is created in the shape of a plaque containing a system of ribs in order to optimize the mechanical performance of the unit; and
- the plaque is inclined in relation to the longitudinal axis of the body in order to improve the aerodynamic performance of the arm.

BRIEF DESCRIPTION OF THE DRAWING

Other characteristics and advantages of the invention will appear in the detailed description which follows, relative to a non-limiting example of production, and which is accompanied by the attached figures which represent, respectively:

Figures - figures 1a and 1b are partially exploded upper and lateral cut views of a wiper arm conforming to the description of the invention, respectively.

Figure 2 - figure 2, a transversal cut view according to the II-II plane of figure 1a.

In figures 1a and 1b, the wiper arm 10 according to the invention presents in a generally elongated shape around a median axis X'X, the arm being made up of a body 12, a plaque 14, an end section 16, and a free end portion 18. The section 16 is created in order to assure the articulated mounting of the arm 10 on the alternating rotation driving means (not represented) on the arm 10. A transversal rod 15 is designed to hook to a wiping pressure screw (not represented).

Outside of these end parts, the body 12 contains, as illustrated on the spread part of figures 1a and 1b, reinforcing ribs 13 coming from casting and made up of transversal inclined partition forming crosspieces.

Conforming to the invention, the thermoplastic material of the body 12 is filled with 25% glass fibers by weight, while the thermoplastic material of the plaque 14, on which the body 12 rests, is filled with 45 % glass fiber by weight. The techniques of incorporating the fibers other than casting are known to a technician in the field.

In this production example, the flange is fixed to the body via soldering. Before soldering the plaque, it is possible to incorporate a canal and sprayers there in order to install the windshield washing system.

The transversal cut view in figure 2 shows the upside-down U shape of the body 12, bounded by two lateral side panels 12a and 12b linked by a back 12c and protecting the ribs 13. The body 12 also presents between the ends 12e of the lateral side panels, an opening towards the window to be wiped and which, according to the invention, is closed by the plaque 14.

The invention is not limited to the production example described and represented. Outside of these specific modes of production described above, it is also possible to create the arm in one single piece, the body and the flange being pre-filled with fibers according to the given percentages or selectively filled in a method other than casting.

In addition, the flange can be created with a variable thickness or a convex curve at one of the ends of the arm, the geometry of the ribs adapting then to the geometry of the flange. The ribs can come from casting with the flange and/or the body, the entire unit between the ribs, the body and flange being created by means already explained.

In addition, the body can incorporate the flange, the unit being created on the internal side of the side panels of the body and not on the ends of the body. Also, the body can present, in transversal cut, in symmetrical polygon shapes, rectangle, trapezoid, etc., or asymmetric, and present rounded tops.

(start new page)

What is Claimed is:

Specifications

1. Mechanical transmission part exposed at least partially to the open air, more specifically a wiper arm (10), made of a plastic material and containing connection means arranged on the end portions of the part, characterized by being formed, outside of the end portions (16, 18), by a body part (12), forming streamlining and made of a thermoplastic material filled with notably no more than 30% fibers, and a flange part (14) not directly exposed, made of a thermoplastic material filled with notably less than 40% fibers.

2. Transmission part according to specification 1, characterized by the thermoplastic material of the body part is notably filled with between 20 and 30 % fibers, and the thermoplastic materials of the flange part is notably filled with between 40 and 50% fibers.

3. Transmission part according to specification 1 or 2 characterized by the fibers being glass or textile fibers, and by a system of ribs (13), coming from casting, placed on the interior of the body-flange unit.

4. Transmission part according to one of the preceding specifications, characterized by the body (12) and the flange (14) forming two parts solidified and by the body (12) presenting two lateral side walls (12a, 12b) linked by a back (12c) and finished by ends (12e), the system or ribs (13) belonging at least partially to the body and the flange.

5. Transmission part according to specification 4, characterized by the two parts being assembled by gluing, soldering, screwing, riveting, or clipping.

6. Transmission part according to specification 5 characterized by the body resting on the flange, the unit being created on the ends (12e) of the lateral side walls of the body.

7. Transmission part according to any of specifications 4 to 6, characterized by, in the situation where the part is a wiper arm (10), the washer canal and sprayers are directly

integrated into the flange.

8. Transmission part according to specification 1, characterized by being constructed from casting, the body and the flange being pre-filled with fibers or selectively filled outside of casting.

9. Transmission part according to any of the preceding specifications, characterized by the flange (14) being inclined in relation to the longitudinal axis (X'X) of the body in order to improve the aerodynamic performance of the arm

10. Transmission piece according to any of the preceding specifications, characterized by the flange being created with a variable thickness and/or a convex curve at one of the ends of the part, the geometry of the ribs being adapted to the geometry of the flange.

11. Transmission part according to any of the preceding specifications, characterized by the body (12) presenting, in a transversal cut, a polygon shape provided there are rounded tops.

Transmission part, in particular a wiper arm, in plastic material with differentiated fillers.

This invention involves the mechanical transmission by elongated parts made of a plastic material and exposed, at least partially, to the open air. Such parts are used in particular as wiper arms, but are also used in the form of connecting rods in the mechanisms of mechanical transmissions.

In this type of use, the plastic material is subjected to severe environmental constraints; mechanical efforts at a high level of repetition, temperature variation, exposure to UV rays, etc. This has resulted in an accelerated aging of the level of mechanical performance, by the appearance of defaults in rigidity and deformation via creep, and at the physical-chemical level via the action of UV rays.

In order to improve the mechanical performance of such parts, it has been proposed in the document DE 2839587 to create them in a symmetrical half shell shape in a plastic mold assembled by a molded hinge.

The patent GB 2021939 describes the implementation of a hood of the arm forming a complete streamlining of the arm. The hood is attached by means of regulators and perhaps made in plastic.

In patent FR 2557052, it was foreseen to cast the metallic arm in order to create a streamlining in plastic material.

These solutions didn't resolve the problem evoked because they divulged global solutions, unlikely to adapt to the changing conditions of the environment.

In order to resolve this problem, and in particular to improve the mechanical and physical-chemical performance of such parts, the present invention proposes to create them in a plastic material with differentiated fillers, dedicated to more specific functions.

More precisely, the subject of the invention is a mechanical transmission part exposed at least partially to the open air, more specifically a wiper arm, made of a plastic material and containing means of connection arranged on the end portions of the part; this part is formed, outside of its end portions, of first a body part, forming a streamlining and made of a thermoplastic material filled with at most 30% fibers, and second, a flange not

directly exposed, the flange part being made of a thermoplastic material filled with at least 40% fibers.

Thus, the functions of the mechanical parts are spread in the space in order to be optimized; the body part, which is the "visible" part, exposed to the environment, is dedicated to the function of style by masking the eventual ribs and by resisting physical-chemical attacks, while the flange part, turned towards the windshield and, thus, not directly exposed, achieves the base architecture of the part by exerting, via its improved rigidity compared to the exposed part, a function of mechanical resistance for the unit, with a reduced permanent deformation. The presentation of a closed structure multiplies, by a factor of four, the inertia of the arm against external attacks.

On the other hand, the casting can be simplified by suppression or diminution of the number of ribs.

According to the specific methods of production:

- the percentage of fibers is notably between 20 and 30% for the body part and between 40 to 50% for the flange part;
- the body and the flange form two solidified parts;
- the fibers are glass or textile fibers such as aramid, polyamides, or polyester.
- the body part contains a system of ribs surrounded by the streamlining;
- the two parts are assembled via gluing, soldering, screwing, riveting, or clipping;
- the windshield washing components, canals and sprayers, are directly integrated into the flange;
- the flange is created in the shape of a plaque containing a system of ribs in order to optimize the mechanical performance of the unit;
- the plaque is inclined in relation to the longitudinal axis of the body in order to improve the aerodynamic performance of the arm;

Other characteristics and advantages of the invention will appear in the detailed description which follows, relative to a non-limiting example of production, and which is accompanied by the attached figures which represent, respectively;

- figures 1a and 1b, partially spread upper and lateral cut views of a wiper arm conforming to the description of the invention;

- figure 2, a transversal cut view according to the II-II plane of figure 1a.

In figures 1a and 1b, the wiper arm 10 according to the invention presents in a generally elongated shape around a median axis X'X, the arm being made up of a body 12, a plaque 14, an end section 16, and a free end portion 18. The section 16 is created in order to assure the articulated mounting of the arm 10 on the alternating rotation driving means (not represented) on the arm 10. A transversal rod 15 is designed to hook to a wiping pressure screw (not represented).

Outside of these end parts, the body 12 contains, as illustrated on the spread part of figures 1a and 1b, reinforcing ribs 13 coming from casting and made up of transversal inclined partition forming crosspieces.

Conforming to the invention, the thermoplastic material of the body 12 is filled with 25% glass fibers by weight, while the thermoplastic material of the plaque 14, on which the body 12 rests, is filled with 45 % glass fiber by weight. The techniques of incorporating the fibers other than casting are known to a technician in the field.

In this production example, the flange is fixed to the body via soldering. Before soldering the plaque, it is possible to incorporate a canal and sprayers there in order to install the windshield washing system.

The transversal cut view in figure 2 shows the upside-down U shape of the body 12, bounded by two lateral side panels 12a and 12b linked by a back 12c and protecting the ribs 13. The body 12 also presents between the ends 12e of the lateral side panels, an opening towards the window to be wiped and which, according to the invention, is closed by the plaque 14.

The invention is not limited to the production example described and represented. Outside of these specific modes of production described above, it is also possible to create the arm in one single piece, the body and the flange being pre-filled with fibers according to the given percentages or selectively filled in a method other than casting.

In addition, the flange can be created with a variable thickness or a convex curve at one of the ends of the arm, the geometry of the ribs adapting then to the geometry of the

flange. The ribs can come from casting with the flange and/or the body, the entire unit between the ribs, the body and flange being created by means already explained.

In addition, the body can incorporate the flange, the unit being created on the internal side of the side panels of the body and not on the ends of the body. Also, the body can present, in transversal cut, in symmetrical polygon shapes; rectangle, trapezoid, etc., or asymmetric, and present rounded tops.

Specifications

1. Mechanical transmission part exposed at least partially to the open air, more specifically a wiper arm (10), made of a plastic material and containing connection means arranged on the end portions of the part, characterized by being formed, outside of the end portions (16, 18), by a body part (12), forming streamlining and made of a thermoplastic material filled with notably no more than 30% fibers, and a flange part (14) not directly exposed, made of a thermoplastic material filled with notably less than 40% fibers.

2. Transmission part according to specification 1, characterized by the thermoplastic material of the body part is notably filled with between 20 and 30 % fibers, and the thermoplastic materials of the flange part is notably filled with between 40 and 50% fibers.

3. Transmission part according to specification 1 or 2 characterized by the fibers being glass or textile fibers, and by a system of ribs (13), coming from casting, placed on the interior of the body-flange unit.

4. Transmission part according to one of the preceding specifications, characterized by the body (12) and the flange (14) forming two parts solidified and by the body (12) presenting two lateral side walls (12a, 12b) linked by a back (12c) and finished by ends (12e), the system or ribs (13) belonging at least partially to the body and the flange.

5. Transmission part according to specification 4, characterized by the two parts being assembled by gluing, soldering, screwing, riveting, or clipping.

6. Transmission part according to specification 5 characterized by the body resting on the flange, the unit being created on the ends (12e) of the lateral side walls of the body.

7. Transmission part according to any of specifications 4 to 6, characterized by, in the situation where the part is a wiper arm (10), the washer canal and sprayers are directly integrated into the flange.

8. Transmission part according to specification 1, characterized by being constructed from casting, the body and the flange being pre-filled with fibers or selectively filled outside of casting.

9. Transmission part according to any of the preceding specifications, characterized by the flange (14) being inclined in relation to the longitudinal axis (X'X) of the body in order to improve the aerodynamic performance of the arm

10. Transmission piece according to any of the preceding specifications, characterized by the flange being created with a variable thickness and/or a convex curve at one of the ends of the part, the geometry of the ribs being adapted to the geometry of the flange.

11. Transmission part according to any of the preceding specifications, characterized by the body (12) presenting, in a transversal cut, a polygon shape provided there are rounded tops.

SUBSTITUTE SPECIFICATION

Our Reference: VWF-513-A (WF 0416) PATENT

TRANSMISSION PART IN PLASTIC MATERIAL WITH DIFFERENTIATED FILLERS

BACKGROUND

[0001] This invention involves the mechanical transmission by elongated parts made of a plastic material and exposed, at least partially, to the open air. Such parts are used, in particular, as wiper arms, but are also used in the form of connecting rods in the mechanisms of mechanical transmissions.

[0002] In this type of use, the plastic material is subjected to severe environmental constraints, mechanical efforts at a high level of repetition, temperature variation, exposure to UV rays, etc. This has resulted in an accelerated aging of the level of mechanical performance, by the appearance of defaults in rigidity and deformation via creep, and at the physical-chemical level via the action of UV rays.

[0003] In order to improve the mechanical performance of such parts, it has been proposed DE 2839587 to create such parts in a symmetrical half shell shape in a plastic mold assembled by a molded hinge.

[0004] The patent GB 2021939 describes the implementation of a hood of the arm forming a complete streamlining of the arm. The hood is attached by means of regulators and, perhaps, made in plastic.

[0005] In patent FR 2557052, it was foreseen to cast the metallic arm in order to create a streamlining in plastic material.

[0006] These solutions did not resolve the problem evoked because they divulged from global solutions, unlikely to adapt to the changing conditions of the environment.

SUMMARY

[0007] In order to resolve this problem, and, in particular, to improve the mechanical and physical-chemical performance of such parts, the

present invention proposes to create such parts in a plastic material with differentiated fillers, dedicated to more specific functions.

[0008] More precisely, the subject of the invention is a mechanical transmission part exposed at least partially to the open air and, more specifically, a wiper arm, made of a plastic material and containing means of connection arranged on the end portions of the part. This part is formed, outside of its end portions, of first a body part, forming a streamlining and made of a thermoplastic material filled with at most 30% fibers, and second, a flange not directly exposed, the flange part being made of a thermoplastic material filled with at least 40% fibers.

[0009] Thus, the functions of the mechanical parts are spread in the space in order to be optimized; the body part, which is the "visible" part, exposed to the environment, is dedicated to the function of style by masking the eventual ribs and by resisting physical-chemical attacks, while the flange part, turned towards the windshield and, thus, not directly exposed, achieves the base architecture of the part by exerting, via its improved rigidity compared to the exposed part, a function of mechanical resistance for the unit, with a reduced permanent deformation. The presentation of a closed structure multiplies, by a factor of four, the inertia of the arm against external attacks.

[0010] On the other hand, the casting can be simplified by suppression or diminution of the number of ribs.

[0011] According to the specific methods of production:

[0012] - the percentage of fibers is notably between 20 and 30% for the body part and between 40 to 50% for the flange part;

[0013] - the body and the flange form two solidified parts;

[0014] - the fibers are glass or textile fibers, such as aramid, polyamides, or polyester;

[0015] - the body part contains a system of ribs surrounded by the streamlining;

[0016] - the two parts are assembled via gluing, soldering, screwing, riveting, or clipping;

[0017] - the windshield washing components, canals and sprayers are directly integrated into the flange;

[0018] - the flange is created in the shape of a plaque containing a system of ribs in order to optimize the mechanical performance of the unit; and - the plaque is inclined in relation to the longitudinal axis of the body in order to improve the aerodynamic performance of the arm;

BRIEF DESCRIPTION OF THE DRAWING

[0019] Other characteristics and advantages of the invention will appear in the detailed description which follows, relative to a non-limiting example of production, and which is accompanied by the attached figures which represent, respectively:

[0020] Figures 1a and 1b are partially exploded upper and lateral cut views, respectively, of a wiper arm conforming to the description of the invention; and

[0021] Figure 2 is a transversal cut view according to the II-II line of Figure 1a.

DETAILED DESCRIPTION

[0022] In Figures 1a and 1b, the wiper arm 10 according to the invention presents a generally elongated shape around a median axis X'X, the arm being made up of a body 12, a plaque 14, an end section 16, and a free end portion 18. The end section 16 is created in order to assure the articulated mounting of the arm 10 on the alternating rotation of driving means (not shown) on the arm 10. A transversal rod 15 is designed to hook to a wiping pressure screw (not shown).

[0023] Outside of these end parts, the body 12 contains, as illustrated on the exploded part of Figures 1a and 1b, reinforcing ribs 13 coming from the casting and made up of transversal inclined partitions forming crosspieces.

[0024] Conforming to the invention, the thermoplastic material of the body 12 is filled with 25% glass fibers by weight, while the thermoplastic material of the plaque 14, on which the body 12 rests, is filled with 45 % glass fiber by weight. The techniques of incorporating the fibers other than by casting are known to a technician in the field.

[0025] In this production example, the flange is fixed to the body 12 via soldering. Before soldering the plaque 14, it is possible to incorporate a canal and sprayers in order to install the windshield washing system.

[0026] The transversal cut view in Figure 2 shows the upside-down U shape of the body 12, bounded by two lateral side panels 12a and 12b linked by a back 12c and protecting the ribs 13. The body 12 also presents between the ends 12e of the lateral side panels, an opening towards the window to be wiped and which, according to the invention, is closed by the plaque 14.

[0027] The invention is not limited to the production example described and represented. Outside of these specific modes of production described above, it is also possible to create the arm 10 in one single piece, the body 12 and the flange being pre-filled with fibers according to the given percentages or selectively filled in a method other than casting.

[0028] In addition, the flange can be created with a variable thickness or a convex curve at one of the ends of the arm 10, the geometry of the ribs 13 adapting then to the geometry of the flange. The ribs 13 can come from casting with the flange and/or the body 12, the entire unit between the ribs 13, the body 12 and flange being created by means explained above.

[0029] In addition, the body 12 can incorporate the flange, the unit being created on the internal side of the side panels 12a, 12b of the body 12 and not on the ends of the body 12. Also, the body 12 can present, in transversal cut, symmetrical polygon shapes, such as rectangle, trapezoid, etc., or asymmetric, and have rounded tops.

What is claimed is:

1. Mechanical transmission part exposed at least partially to the open air, more specifically a wiper arm (10), made of a plastic material and containing connection means arranged on the end portions of the part, characterized by being formed, outside of the end portions (16, 18), by a body part (12), forming streamlining and made of a thermoplastic material filled with notably no more than 30% fibers, and a flange part (14) not directly exposed, made of a thermoplastic material filled with notably less than 40% fibers.

2. Transmission part according to specification 1, characterized by the thermoplastic material of the body part is notably filled with between 20 and 30 % fibers, and the thermoplastic materials of the flange part is notably filled with between 40 and 50% fibers.

3. Transmission part according to specification 1 or 2 characterized by the fibers being glass or textile fibers, and by a system of ribs (13), coming from casting, placed on the interior of the body-flange unit.

4. Transmission part according to one of the preceding specifications, characterized by the body (12) and the flange (14) forming two parts solidified and by the body (12) presenting two lateral side walls (12a, 12b) linked by a back (12c) and finished by ends (12e), the system or ribs (13) belonging at least partially to the body and the flange.

5. Transmission part according to specification 4, characterized by the two parts being assembled by gluing, soldering, screwing, riveting, or clipping.

6. Transmission part according to specification 5 characterized by the body resting on the flange, the unit being created on the ends (12e) of the lateral side walls of the body.

7. Transmission part according to any of specifications 4 to 6, characterized by, in the situation where the part is a wiper arm (10), the washer canal and sprayers are directly integrated into the flange.

8. Transmission part according to specification 1, characterized by being constructed from casting, the body and the flange being pre-filled with fibers or selectively filled outside of casting.

9. Transmission part according to any of the preceding specifications, characterized by the flange (14) being inclined in relation to the longitudinal axis (X'X) of the body in order to improve the aerodynamic performance of the arm.

10. Transmission piece according to any of the preceding specifications, characterized by the flange being created with a variable thickness and/or a convex curve at one of the ends of the part, the geometry of the ribs being adapted to the geometry of the flange.

11. Transmission part according to any of the preceding specifications, characterized by the body (12) presenting, in a transversal cut, a polygon shape provided there are rounded tops.

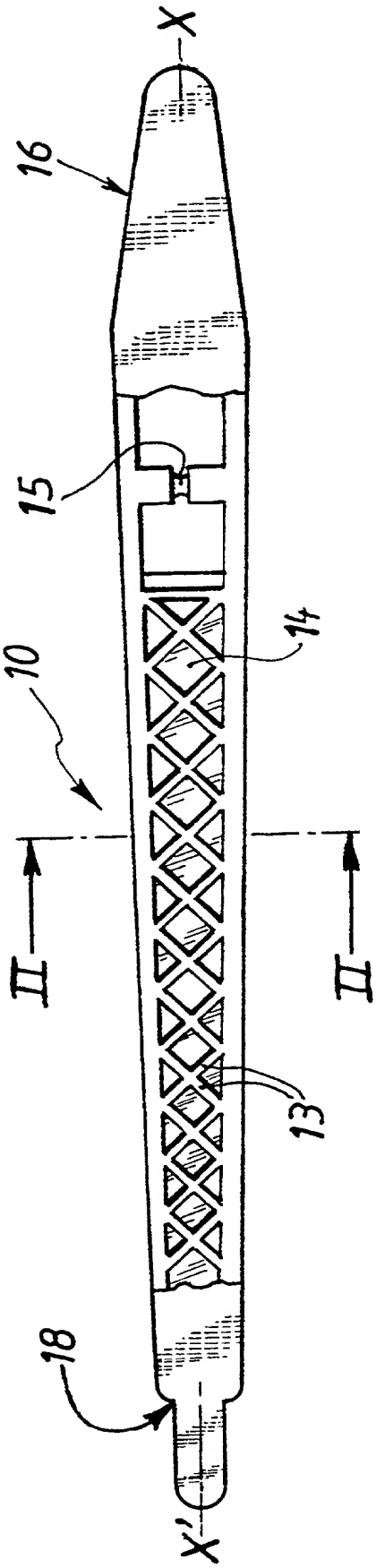

FIG.1a

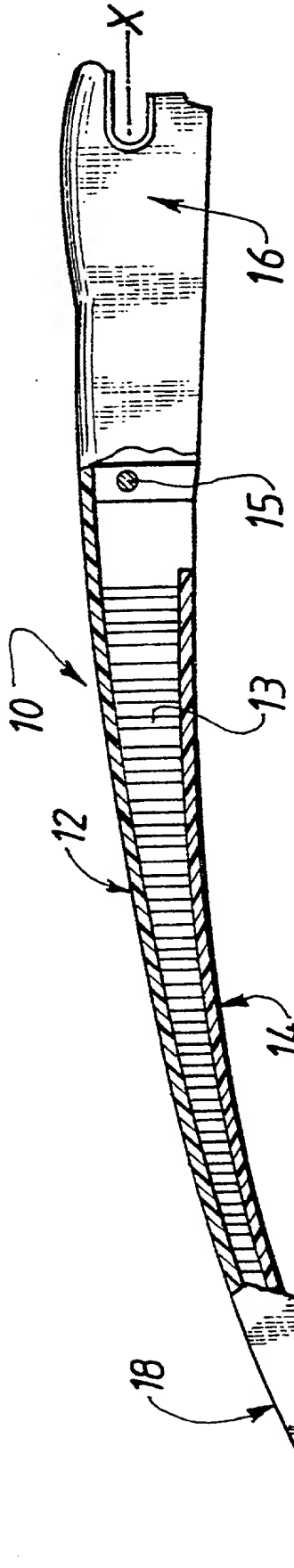

FIG.1b

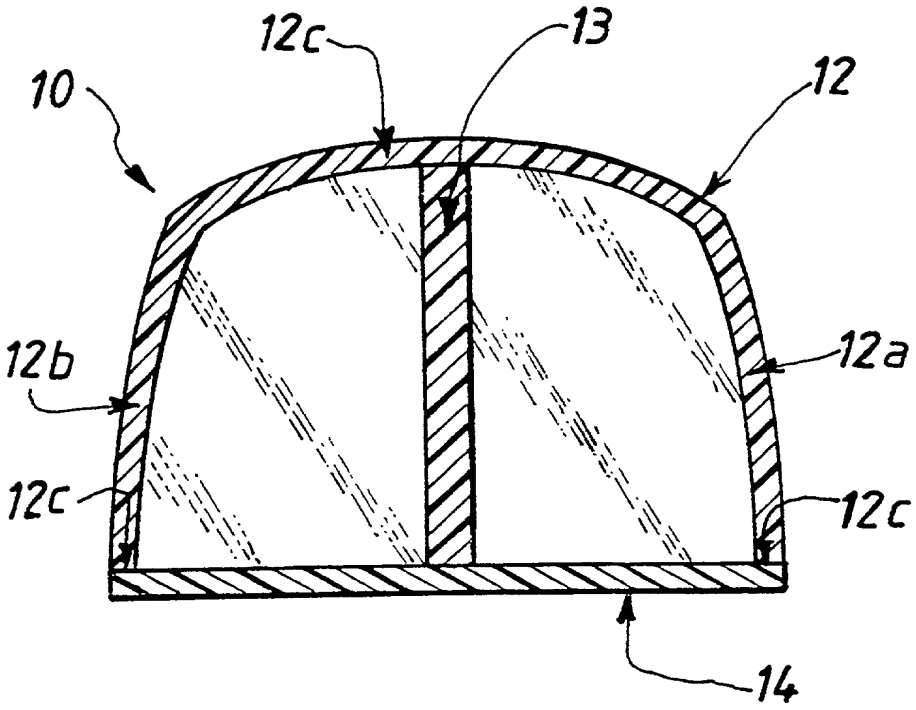

FIG. 2

Our Reference: VWF-513-A (WF0416)

COMBINED DECLARATION AND POWER OF ATTORNEY

DECLARATION:

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

TRANSMISSION PART, IN PARTICULAR WIPER ARM, IN PLASTIC MATERIAL WITH DIFFERENTIATED FILLERS

the specification of which (check only one item below):

[ ] is attached hereto.

[X] was filed as United States application Serial No. 09/787,992 on March 23, 2001, and was amended on or through _____(if applicable).

[ ] was filed as PCT international application Number _____ on _____, and was amended under PCT Article 19 on _____(if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, §1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, §119(a)-(d) or §365(b) of any foreign application(s) for patent or inventor's certificate or §365(a) of any PCT international application(s) which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or PCT international application(s) having a filing date before that of the application on which priority is claimed:

Prior Foreign/PCT Application(s) and any Priority Claims Under 35 U.S.C. §119:			Priority Claimed	
PCT/FR99/02280	WIPO	24 September 1999	[X]	[ ]
(Number)	(Country)	(Day/Mo/Yr Filed)	Yes	No
98/11917	France	24 September 1998	[X]	[ ]
(Number)	(Country)	(Day/Mo/Yr Filed)	Yes	No

I hereby claim the benefit under 35 U.S.C. §119(e) of any United States provisional application(s) listed below.

(Application Number)	(Filing Date)
(Application Number)	(Filing Date)

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) or §365(c) of any PCT international application(s) designating the United States of America, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT international application(s) in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, §1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.

Prior U. S. Application(s) or PCT International Application(s) Designating the U.S. for Benefit Under 35 U.S.C. §120:

(Application Number)	(Filing Date)	(Status: patented, pending, abandoned)
(Application Number)	(Filing Date)	(Status: patented, pending, abandoned)

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POWER OF ATTORNEY:

I hereby appoint the following attorney(s) and/or agent(s) J. Gordon Lewis, Patent Office Registration No. 28735, Andrew R. Basile, Patent Office Registration No. 24753, William M. Hanlon, Jr., Patent Office Registration No. 28422, and Thomas D. Helmholdt, Patent Office Registration No. 33181, as my attorney(s) and/or agent(s), to prosecute this application and to transact all business in the United States Patent and Trademark Office connected therewith.

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under §1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

1-00

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